

CLAIMS:

What is claimed is:

1. A wireless communication system that provides wireless service to a mobile unit operating on one of a first carrier frequency and a second carrier frequency within a service area, the first and second carrier frequencies being in the same or different bands, the wireless communication system comprising:

at least one base station controller, the at least one base station controller producing a capacity request in response to a request made by the mobile unit on an originating carrier frequency of the first and second carrier frequencies; a first plurality of base stations coupled to the at least one base station controller, the first plurality of base stations operating on a first carrier frequency, at least one candidate base station of the first plurality of base stations receiving the capacity request, determining its net excess capacity based upon available forward link resources and available reverse link resources, and responding with a net excess capacity response; a second plurality of base stations coupled to the at least one base station controller, the second plurality of base stations operating on a second carrier frequency, at least one candidate base station of the second plurality of base stations receiving the capacity request, determining its net excess capacity based upon available forward link resources and available reverse link resources, and responding with a net excess capacity response; and the at least one base station controller operating to assign the mobile unit by selecting at least one servicing base station from the candidate base stations based upon the received net excess capacity responses by selecting the originating carrier frequency despite a higher priority for the other of the first and second carrier frequencies whenever adequate capacity is indicated in the excess capacity responses for the originating carrier frequency to at least one responding candidate base station of the first plurality of base stations or to at least one responding candidate base station of the second plurality of base stations based upon received net excess capacity responses.

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1 2. The wireless communication system of Claim 1 wherein inadequate
2 capacity is indicated in the excess capacity responses for the originating carrier
3 frequency, and further including:

4 the at least one base station controller selecting the other of the carrier
5 frequencies than the originating carrier frequency.

1 3. The wireless communication system of Claim 2, wherein at least one of
2 the frequencies other than the originating carrier frequency has an assigned high
3 priority, and further including:

4 the at least one base station controller waiting a specified time period for a
5 capacity estimate response for carrier frequencies of the assigned high priority;

6 when the capacity estimate response from at least one of the high priority
7 carrier frequencies is positive, the at least one base station controller selecting a
8 servicing base station from the candidate base stations based upon the received
9 positive excess capacity responses for the at least one of the high priority carrier
10 frequencies; and

11 the at least one base station controller servicing the mobile unit with the
12 selected servicing base station on the at least one of the high priority carrier
13 frequencies.

1 4. A wireless communication system that provides wireless service to a
2 mobile unit operating within a service area, the wireless communication system
3 comprising:

4 a plurality of base station controllers in at least partially overlapping
5 sectors, at least one of the base station controllers producing a capacity request in
6 response to a request made by the mobile unit; the plurality of base station
7 controllers each having a first plurality of base stations coupled to them, the first
8 plurality of base stations operating on a first carrier frequency, at least one
9 candidate base station of the first plurality of base stations receiving the capacity
10 request, determining its net excess capacity based upon available forward link
11 resources and available reverse link resources, and responding with a net excess
12 capacity response; the plurality of base station controllers each further having a
13 second plurality of base stations coupled to them, the second plurality of base

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stations operating on a second carrier frequency, the first and second carrier frequencies being in the same or different bands, at least one candidate base station of the second plurality of base stations receiving the capacity request, determining its net excess capacity based upon available forward link resources and available reverse link resources, and responding with a net excess capacity response; and the base station controllers operating to assign the mobile unit to a responding candidate base station of the plurality of base station controllers based upon received net excess capacity responses.

5. The wireless communication system of Claim 4, wherein at least one of the frequencies other than the originating carrier frequency has an assigned high priority, and further including:

the at least one base station controller waiting a specified time period for a capacity estimate response for carrier frequencies of the assigned high priority;

when the capacity estimate response from at least one of the high priority carrier frequencies is positive, the at least one base station controller selecting a servicing base station from the candidate base stations based upon the received positive excess capacity responses for the high priority carrier frequency; and the at least one base station controller servicing the mobile unit with the selected servicing base station on the high priority carrier frequency.

6. A wireless communication system that provides wireless service to a mobile unit operating within a service area, the wireless communication system comprising:

at least one base station controller, the at least one base station controller producing a capacity request in response to a request made by the mobile unit; a first plurality of base stations coupled to the at least one base station controller, the first plurality of base stations operating on a first carrier frequency, at least one candidate base station of the first plurality of base stations receiving the capacity request, determining its net excess capacity based upon available forward link resources and available reverse link resources, and responding with a net excess capacity response; a second plurality of base stations coupled to the at least one base station controller, the second plurality of base stations operating on a second

13 carrier frequency, the first and second carrier frequencies being in the same or
14 different bands, at least one candidate base station of the second plurality of base
15 stations receiving the capacity request, determining its net excess capacity based
16 upon available forward link resources and available reverse link resources, and
17 responding with a net excess capacity response;

18 at least one of the first and second carrier frequencies having an assigned
19 high priority; and the at least one base station controller waiting a specified time
20 period for a capacity estimate response for carrier frequencies of the assigned high
21 priority and, when the capacity estimate response from the high priority carrier
22 frequency is positive, operating to assign the mobile unit to at least one
23 responding candidate base station of the first plurality of base stations or to at least
24 one responding candidate base station of the second plurality of base stations
25 based upon received net excess capacity response from the high priority carrier
26 frequency.

1 7. The wireless communication system of Claim 6, wherein only one of the
2 carrier frequencies has an assigned high priority, and wherein the at least one base
3 station controller waits the specified time period for a capacity estimate response
4 of the carrier frequency of the assigned high priority.

1 8. The wireless communication system of Claim 7, wherein no capacity
2 response is received for the carrier frequency of the assigned high priority and the
3 at least one base station controllers selecting a servicing base station based upon
4 received positive excess capacity response for the other carrier frequency.

1 9. The wireless communication system of Claim 6, wherein a plurality of the
2 carrier frequencies have an assigned high priority, and wherein the at least one
3 base station controller waits the specified time period for a capacity response of
4 each carrier frequency of the assigned high priority.

1 10. The wireless communication system of Claim 9, wherein no capacity
2 response is received for the plurality of carrier frequencies with the assigned high
3 priority, and wherein the at least one base station controller selects a servicing

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- 4 base station from the candidate base stations based upon the highest received
5 positive excess capacity response.

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1 11. A wireless communication system that provides wireless service to a
2 mobile unit operating within a service area, the wireless communication system
3 comprising:

4 a plurality of base station controllers in at least partially overlapping
5 sectors, the base station controllers producing a capacity request in response to a
6 request made by the mobile unit; at least one of the plurality of base station
7 controllers having a first plurality of base stations coupled thereto, the first
8 plurality of base stations operating on a first carrier frequency and a second carrier
9 frequency, the first and second carrier frequencies being in the same or different
10 bands, at least one candidate base station of the first plurality of base stations
11 receiving the capacity request, determining its net excess capacity based upon
12 available forward link resources and available reverse link resources, and
13 responding with a net excess capacity response; at least one of the plurality of
14 base station controllers having a second plurality of base stations coupled thereto,
15 the second plurality of base stations operating only on one of the first and second
16 carrier frequencies, at least one candidate base station of the second plurality of
17 base stations receiving the capacity request, determining its net excess capacity
18 based upon available forward link resources and available reverse link resources,
19 and responding with a net excess capacity response; and the at least one base
20 station controller operating if the excess capacity responses for the base stations in
21 overlapping sectors indicate inadequate capacity on a first one of the first and
22 second carrier frequencies to assign the mobile unit to at least one responding
23 candidate base station of the first plurality of base stations on the other of the first
24 and second carrier frequencies.

1 12. The wireless communication system of Claim 11, wherein at least one of
2 the first and second frequencies has an assigned high priority, and further
3 including:

4 the at least one base station controller waiting a specified time period for a
5 capacity estimate response for carrier frequencies of the assigned high priority;

6 when the capacity estimate response from at least one of the carrier
7 frequencies of the assigned high priority is positive, the at least one base station

8 controller selecting a servicing base station from the candidate base stations based
9 upon the received positive excess capacity response for the high priority carrier
10 frequency; and the at least one base station controller servicing the mobile unit
11 with the selected servicing base station on the selected high priority carrier
12 frequency.

1 13. In a wireless communication system including a first plurality of base
2 stations that operate on a first carrier frequency and a second plurality of base
3 stations that operate on a second carrier frequency, the first and second carrier
4 frequencies being in the same or different bands, the first plurality of base stations
5 and the second plurality of base stations providing overlaying service, a method of
6 operation comprising:

7 receiving a request from a mobile unit on one of the first and second
8 carrier frequencies as an originating carrier frequency; determining an operational
9 position of the mobile unit based upon the location of a base station receiving the
10 request; based upon the operational position of the mobile unit, requesting
11 capacity information from candidate base stations of the first plurality of base
12 stations and candidate base stations of the second plurality of base stations;
13 receiving net excess capacity responses from the candidate base stations, each net
14 excess capacity response based upon available forward link resources and
15 available reverse link resources of a respective candidate base station; selecting at
16 least one servicing base station from the candidate base stations based upon the
17 received net excess capacity responses by selecting the originating carrier
18 frequency despite a higher priority for the other of the first and second carrier
19 frequencies whenever adequate capacity is indicated in the excess capacity
20 responses for the originating carrier frequency; and servicing the mobile unit with
21 the selected at least one servicing base station on the originating carrier frequency.

1 14. The method of Claim 13, wherein inadequate capacity is indicated in the
2 excess capacity responses for the originating carrier frequency during the step of
3 receiving net excess capacity responses, and wherein the step of selecting
4 comprises the step of:

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5 selecting the other of the carrier frequencies than the originating carrier
6 frequency.

1 15. The method of Claim 14, wherein at least one of the frequencies other than
2 the originating carrier frequency has an assigned high priority, and further
3 including the steps of:

4 waiting a specified time period for a capacity estimate response for carrier
5 frequencies of the assigned high priority;

6 when the capacity estimate response from at least one of the high priority
7 carrier frequencies is positive, selecting a servicing base station from the
8 candidate base stations based upon the received positive excess capacity responses
9 for the at least one of the high priority carrier frequencies; and servicing the
10 mobile unit with the selected servicing base station on the at least one of the high
11 priority carrier frequencies.

1 16. In a wireless communication system including a plurality of base station
2 controllers in at least partially overlapping sectors, at least one of the plurality of
3 base station controllers having a first plurality of base stations that operate on a
4 first carrier frequency and a second plurality of base stations that operate on a
5 second carrier frequency, the first and second carrier frequencies being in the
6 same or different bands, the first plurality of base stations and the second plurality
7 of base stations providing overlaying service, a method of operation comprising:

8 receiving a request from a mobile unit; determining an operational position
9 of the mobile unit based upon the location of a base station receiving the request;
10 based upon the operational position of the mobile unit, requesting capacity
11 information from candidate base stations of the first plurality of base stations and
12 candidate base stations of the second plurality of base stations for base station
13 controllers in sectors overlapping the location of the base station receiving the
14 request; receiving net excess capacity responses from the candidate base stations,
15 each net excess capacity response based upon available forward link resources and
16 available reverse link resources of a respective candidate base station;

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17 when the candidate base station is associated with a cell in which the
18 mobile station accessed the wireless communication system, retaining that
19 candidate base station as one of the candidate base stations;

20 selecting at least one servicing base station from the retained candidate
21 base stations of the base station controllers in overlapping sectors based upon the
22 received net excess capacity responses, the at least one servicing base station
23 corresponding to either the first carrier frequency or the second carrier frequency;
24 and servicing the mobile unit with the selected base station.

1 17. The method of Claim 16, wherein at least one of the carrier frequencies
2 has an assigned high priority, and further including the steps of:

3 waiting a specified time period for a capacity estimate response for carrier
4 frequencies of the assigned high priority;

5 when the capacity estimate response from at least one of the high priority
6 carrier frequencies is positive, selecting a servicing base station from the
7 candidate base stations based upon the received positive excess capacity responses
8 for the high priority carrier frequency; and servicing the mobile unit with the
9 selected servicing base station on the high priority carrier frequency.

1 18. In a wireless communication system including a first plurality of base
2 stations that operate on a first carrier frequency and a second plurality of base
3 stations that operate on a second carrier frequency, the first and second carrier
4 frequencies being in the same or different bands, the first plurality of base stations
5 and the second plurality of base stations providing overlaying service, at least one
6 of the frequencies for the base stations having an assigned high priority, a method
7 of operation comprising:

8 receiving a request from a mobile unit; determining an operational position
9 of the mobile unit based upon the location of a base station receiving the request;
10 based upon the operational position of the mobile unit, requesting capacity
11 information from candidate base stations of the first plurality of base stations and
12 candidate base stations of the second plurality of base stations;

13 waiting a specified time period for a capacity estimate response for carrier
14 frequencies of the assigned high priority; receiving net excess capacity responses

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15 from the candidate base stations, each net excess capacity response based upon
16 available forward link resources and available reverse link resources of a
17 respective candidate base station;

18 when the capacity estimate response from the high priority carrier
19 frequency is positive, selecting a servicing base station from the candidate base
20 stations based upon the received positive excess capacity responses for the high
21 priority carrier frequency; and servicing the mobile unit with the selected
22 servicing base station on the high priority carrier frequency.

1 19. The method of Claim 18, wherein only one of the carrier frequencies has
2 an assigned high priority, and wherein the step of waiting comprises:

3 waiting the specified time period for a capacity estimate response for the
4 carrier frequency of the assigned high priority.

1 20. The method of Claim 19, wherein no capacity response is received from
2 the carrier frequency with the high priority, and wherein the step of selecting
3 comprises the step of:

4 selecting a servicing base station from the candidate base stations based
5 upon the received positive excess capacity responses for the next highest priority
6 carrier frequency.

1 21. The method of Claim 18, wherein a plurality of the carrier frequencies
2 have an assigned high priority, and wherein the step of waiting comprises:

3 waiting the specified time period for a capacity estimate response for each
4 carrier frequency of the assigned high priority.

1 22. The method of Claim 21, wherein no capacity response is received from
2 the plurality of carrier frequencies with the high priority, and wherein the step of
3 selecting comprises the step of:

4 selecting a servicing base station from the candidate base stations based
5 upon the highest received positive excess capacity response.

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1 23. In a wireless communication system including a plurality of base station
2 controllers in at least partially overlapping sectors, at least one of the plurality of
3 base station controllers having a first plurality of base stations that operate on a
4 first carrier frequency and a second plurality of base stations that operate on a
5 second carrier frequency, the first and second carrier frequencies being in the
6 same or different bands, the first plurality of base stations and the second plurality
7 of base stations providing overlaying service, and at least one of the plurality of
8 base station controllers having a base station that operates only on one of the first
9 and second carrier frequencies, a method of operation comprising:

10 receiving a request from a mobile unit; determining an operational position
11 of the mobile unit based upon the location of a base station receiving the request;
12 based upon the operational position of the mobile unit, requesting capacity
13 information from candidate base stations of the plurality of base station controllers
14 in sectors overlapping the location of the base station receiving the request;
15 receiving net excess capacity responses from the candidate base stations, each net
16 excess capacity response based upon available forward link resources and
17 available reverse link resources of a respective candidate base station; if the
18 excess capacity responses for the base stations in overlapping sectors indicate
19 inadequate capacity on a first one of the first and second carrier frequencies,
20 selecting at least one servicing base station on the other of the first and second
21 carrier frequencies from the candidate base stations of the base station controllers
22 in overlapping sectors based upon the received net excess capacity responses; and
23 servicing the mobile unit with the selected servicing base station.

1 24. The method of Claim 23, wherein at least one of the first and second
2 frequencies has an assigned high priority, and further including the steps of:

3 waiting a specified time period for a capacity estimate response for carrier
4 frequencies of the assigned high priority;

5 when the capacity estimate response from at least one of the carrier
6 frequencies of the assigned high priority is positive, selecting a servicing base
7 station from the candidate base stations based upon the received positive excess
8 capacity response for the high priority carrier frequency; and servicing the mobile

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unit with the selected servicing base station on the selected high priority carrier frequency.

25. A computer readable medium that is readable by at least one component of a wireless communication system that includes a first plurality of base stations that operate on a first carrier frequency and a second plurality of base stations that operate on a second carrier frequency and that supports a mobile unit, the first and second carrier frequencies being in the same or different bands, the first plurality of base stations and the second plurality of base stations providing overlaying service, the computer readable medium comprising:

a set of instructions that, when executed by the wireless communication system, cause the wireless communication system to perform the following operations: receive a request from a mobile unit on one of the first and second carrier frequencies as an originating carrier frequency; determine an operational position of the mobile unit based upon the location of a base station receiving the request; based upon the operational position of the mobile unit, request capacity information from candidate base stations of the first plurality of base stations and candidate base stations of the second plurality of base stations; receive net excess capacity responses from the candidate base stations, each net excess capacity response based upon available forward link resources and available reverse link resources for a respective candidate base station; select at least one servicing base station at the originating carrier frequency from the candidate base stations based upon the received net excess capacity responses, despite a higher priority for the other of the first and second carrier frequencies, whenever adequate capacity is indicated in the excess capacity responses for the originating carrier frequency; and service the mobile unit with the selected servicing base station on the originating carrier frequency.

26. The computer readable medium of Claim 25, wherein the set of instructions includes instructions that cause the wireless communication system to:

4 select the other of the carrier frequencies than the originating carrier
5 frequency when inadequate capacity is indicated in the responses for the
6 originating carrier frequency.

1 27. The computer readable medium of Claim 26, wherein at least one of the
2 frequencies other than the originating carrier frequency has an assigned high
3 priority, and wherein the set of instructions includes instructions that cause the
4 wireless communication system to:

5 wait a specified time period for a capacity estimate response for carrier
6 frequencies of the assigned high priority;

7 when the capacity estimate response from at least one of the high priority
8 carrier frequencies is positive, select a servicing base station from the candidate
9 base stations based upon the received positive excess capacity responses for the at
10 least one of the high priority carrier frequencies; and service the mobile unit with
11 the selected servicing base station on the at least one of the high priority carrier
12 frequencies.

1 28. A computer readable medium that is readable by at least one component of
2 a wireless communication system that includes a plurality of base station
3 controllers in at least partially overlapping sectors, at least one of the plurality of
4 base station controllers having a first plurality of base stations that operate on a
5 first carrier frequency and a second plurality of base stations that operate on a
6 second carrier frequency and that supports a mobile unit, the first and second
7 carrier frequencies being in the same or different bands, the first plurality of base
8 stations and the second plurality of base stations providing overlaying service, the
9 computer readable medium comprising:

10 a set of instructions that, when executed by the wireless communication
11 system, cause the wireless communication system to perform the following
12 operations: receive a request from a mobile unit; determine an operational position
13 of the mobile unit based upon the location of a base station receiving the request;
14 based upon the operational position of the mobile unit, request capacity
15 information from candidate base stations of the plurality of base station controllers
16 and candidate base stations of the second plurality of base stations; receive net

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17 excess capacity responses from the candidate base stations, each net excess
18 capacity response based upon available forward link resources and available
19 reverse link resources for a respective candidate base station; select at least one
20 servicing base station from the candidate base stations of the base station
21 controllers in overlapping sectors based upon the received net excess capacity
22 responses, the at least one servicing base station corresponding to either the first
23 carrier frequency or the second carrier frequency; and service the mobile unit with
24 the selected servicing base station.

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1 29. The computer readable medium of Claim 28, wherein at least one of the
2 carrier frequencies has an assigned high priority, and wherein the set of
3 instructions includes instructions that cause the wireless communication system
4 to:

5 wait a specified time period for a capacity estimate response for carrier
6 frequencies of the assigned high priority;

7 when the capacity estimate response from at least one of the high priority
8 carrier frequencies is positive, select a servicing base station from the candidate
9 base stations based upon the received positive excess capacity responses for the
10 high priority carrier frequency; and service the mobile unit with the selected
11 servicing base station on the high priority carrier frequency.

1 30. A computer readable medium that is readable by at least one component of
2 a wireless communication system that includes a first plurality of base stations
3 that operate on a first carrier frequency and a second plurality of base stations that
4 operate on a second carrier frequency and that supports a mobile unit, the first and
5 second carrier frequencies being in the same or different bands, the first plurality
6 of base stations and the second plurality of base stations providing overlaying
7 service, at least one of the base stations having an assigned high priority, the
8 computer readable medium comprising:

9 a set of instructions that, when executed by the wireless communication
10 system, cause the wireless communication system to perform the following
11 operations: receive a request from a mobile unit; determine an operational position
12 of the mobile unit based upon the location of a base station receiving the request;
13 based upon the operational position of the mobile unit, request capacity
14 information from candidate base stations of the first plurality of base stations and
15 candidate base stations of the second plurality of base stations;

16 wait a specified time period for a capacity estimate response for carrier
17 frequencies of the assigned high priority;

18 receive net excess capacity responses from the candidate base stations,
19 each net excess capacity response based upon available forward link resources and
20 available reverse link resources for a respective candidate base station; if the
21 capacity estimate response from the highest priority carrier frequency is positive,

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22 select a servicing base station from the candidate base stations based upon the
23 positive net excess capacity responses for the highest priority carrier frequency;
24 and service the mobile unit with the selected servicing base station on the highest
25 priority carrier frequency.

1 31. The computer readable medium of Claim 30, wherein the set of
2 instructions includes instructions that cause the wireless communication system
3 to:

4 wait the specified time period for a capacity estimate response for the
5 carrier frequency of the assigned high priority.

1 32. The computer readable medium of Claim 31, wherein the set of
2 instructions includes instructions that cause the wireless communication system
3 to:

4 select a servicing base station from the candidate base stations based upon
5 the received positive excess capacity responses for the next highest priority carrier
6 frequency.

1 33. The computer readable medium of Claim 30, wherein the set of
2 instructions includes instructions that cause the wireless communication system
3 to:

4 wait the specified time period for a capacity estimate response for each
5 carrier frequency of the assigned high priority.

1 34. The computer readable medium of Claim 33, wherein the set of
2 instructions includes instructions that cause the wireless communication system
3 to:

4 select a servicing base station from the candidate base stations based upon
5 the highest received positive excess capacity response.

1 35. A computer readable medium that is readable by at least one component of
2 a wireless communication system that includes a plurality of base station
3 controllers in at least partially overlapping sectors, at least one of the plurality of

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4 base station controllers having a first plurality of base stations that operate on a
5 first carrier frequency and a second plurality of base stations that operate on a
6 second carrier frequency and that supports a mobile unit, the first and second
7 carrier frequencies being in the same or different bands, the first plurality of base
8 stations and the second plurality of base stations providing overlaying service, and
9 at least one of the plurality of base station controllers having a base station that
10 operates only on one of the first and second carrier frequencies, the computer
11 readable medium comprising:

12 a set of instructions that, when executed by the wireless communication
13 system, cause the wireless communication system to perform the following
14 operations: receive a request from a mobile unit; determine an operational position
15 of the mobile unit based upon the location of a base station receiving the request;
16 based upon the operational position of the mobile unit, request capacity
17 information from candidate base stations of the plurality of base station
18 controllers; receive net excess capacity responses from the candidate base stations,
19 each net excess capacity response based upon available forward link resources and
20 available reverse link resources for a respective candidate base station; if the
21 excess capacity responses for the base stations in overlapping sectors indicate
22 inadequate capacity on a first one of the first and second carrier frequencies, select
23 at least one servicing base station of the base station controllers in overlapping
24 sectors on the other of the first and second carrier frequencies from the candidate
25 base stations based upon the received net excess capacity responses, the at least
26 one servicing base station corresponding to either the first carrier frequency or the
27 second carrier frequency; and service the mobile unit with the at selected servicing
28 base station.

1 36. The computer readable medium of Claim 35, wherein at least one of the
2 carrier frequencies has an assigned high priority, and wherein the set of
3 instructions includes instructions that cause the wireless communication system
4 to:

5 wait a specified time period for a capacity estimate response for carrier
6 frequencies of the assigned high priority;

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7 when the capacity estimate response from at least one of the carrier
8 frequencies of the assigned high priority is positive, select a servicing base station
9 from the candidate base stations based upon the received positive excess capacity
10 response for the high priority carrier frequency; and service the mobile unit with
11 the selected servicing base station on the selected high priority carrier frequency.

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